Lawrence Livermore National Laboratory
University of California

CONTAMINATION ANALYSIS UNIT (CAU)

The "just enough" cleaning technology

Parts and equipment cleaning is a source of hazardous waste and VOC air emissions throughout American industry and the Department of Energy (DOE) complex. New products must be cleaned before paint or other coatings can be applied. The cleaning process is integral to metal machining, electroplating, airplane and automobile manufacturing, composites molding and machining, and electronic fabrication activities, such as printed circuit board manufacture and assembly.

Cleaning technicians cannot accurately determine the degree of cleanliness during the cleaning process because hydrocarbon residues are invisible. Therefore, too much or too little cleaner is often used. If too much is used, more waste is produced. If too little is used, the part must be recleaned, producing even greater waste. Introducing a technology that monitors residue levels during the cleaning process would reduce waste and air emissions caused by over- or under-cleaning. Such real-time process controls would help reduce pollution in a variety of industries.

Applications

- *Metal machining*
- *Electroplating*
- *Electronics fabrication*
- *Airplane and automobile manufacturing*
- *Composites molding and machining*

Verification of contamination levels

Lawrence Livermore National Laboratory (LLNL) is developing a real-time sensing technology that can verify residue levels on parts and equipment as they are cleaned in industrial production lines. The contamination analysis unit (CAU) can be used in a range of DOE and industrial cleaning applications. It can be moved quickly from one area of an assembly line to another and generates highly precise data. In bench-scale testing of the sensor concept, hydrocarbon contamination layer thicknesses of the order of 1 nanometer were routinely measured. This measurement corresponds to contamination only a few monolayers thick. The sensor identifies the type of contamination, distinguishes between hydrocarbon species, and detects other common contaminants, such as silicone oils. Finally, the components of the CAU are inexpensive; once commercialized, the unit should be affordable to medium- and small-sized shops as well as to larger plants.

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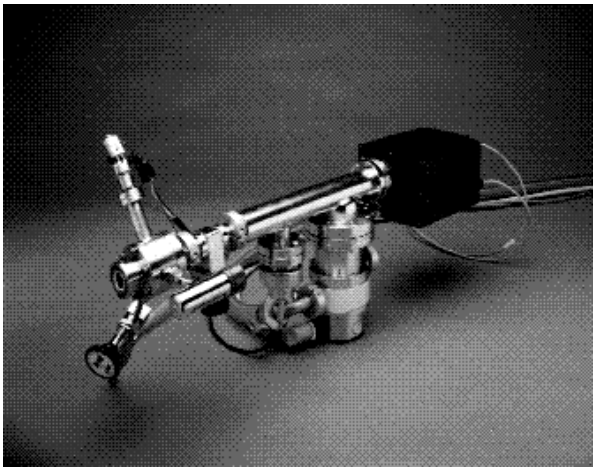

The CAU monitors contamination levels during the cleaning process.

Please write or call us for additional information:

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